

REMARKS

The Examiner's comments together with the cited references have been carefully studied. Favorable reconsideration in view of the foregoing amendments and following remarks is respectfully requested.

Claims 19, 21-26, and 29-39 were pending in the application. Claims 31-39 are withdrawn. Claims 19, 21-26, 29, and 30 have been rejected. Claim 19 herewith is amended. New claim 40 has been added. Claims presently active are claims 19, 21-26, 29, 30, and 40. Favorable reconsideration of the application in view of the following remarks is respectfully requested.

The title has been changed as suggested by the Examiner.

The specification has been changed to correct the problems kindly noted by the Examiner.

Claim 1 has been amended to recite that, in stretching the sheet biaxially, both draw ratios in the longitudinal and transverse directions are greater than 3 times and not more than 5 times, and the area ratio between the non-stretched sheet and the biaxially stretched film are greater than 10 times and not more than 20 times, to form interconnected microvoids around the inorganic particles. New claim 40 recites that both draw ratios in the longitudinal and transverse directions are at least about 3.3 times to 5 times and the area ratio between the non-stretched sheet and the biaxially stretched film is at least about 11 times and not more than 20 times. Support for these amendments is to be found in the original specification on page 12, lines 22 to 25, and Example 5 on page 22, in which the stretch ratio in the machine and transverse directions was 3.3, for a total of area ratio of about 11 (to two significant figures, which therefore encompasses the range between about 10.5 and 11.5).

Relying on 35 U.S.C. 102(b), the Examiner rejected claims 19 and 21-26 as being anticipated by Morita et al. Applicants respectfully traverse the Examiner's rejection, and request reconsideration.

Applicants respectfully submit that Morita et al. do not disclose, teach, or suggest the present invention. Morita et al. nowhere disclose stretching the sheet biaxially, in which both draw ratios in the longitudinal and transverse directions are greater than 3 times and not more

than 5 times, and the area ratio between the non-stretched sheet and the biaxially stretched film is greater than 10 times and not more than 20 times, to form interconnected microvoids around the inorganic particles, thereby obtaining a permeable microvoided sheet that is a monolayer film of polylactic-acid-based material having a total absorbent capacity of at least about 14 cc/m².

Applicants therefore respectfully request that the Examiner reconsider and withdraw the rejection of the claims under 35 U.S.C. 102(b).

Claims 29 and 30 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Morita et al. and further in view of Kanai et al. (*Film Processing*, pages 322 and 323). It is the conclusion of the Examiner that “It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Kanai’s simultaneous biaxial stretching in the process of Morita in order to have good processability and simultaneous relaxation” and “It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Kanai’s stretching film in a machine direction first followed by a transverse direction in the process of Morita in order to avoid the shortcomings of the other biaxial stretching: a) simultaneous biaxial stretching – unsuitable for high-speed processing and b) TD then D (transverse then machine direction) biaxial stretching- uniformly stretching wide film....”

The rejection is traversed. Applicants take the position that Morita et al. do not disclose the present invention for the reasons stated above. Morita et al. do not teach more than a total of 10 times stretch. In the only example of two stage stretching in Morita et al. (Example 3), the sample is stretched biaxially 3 times in both directions. In fact, Morita et al. state that “The degree of stretching exceeding 10 times often leads to unfavorable breakage of the film.” Thus, Morita et al. teach away from the present invention.

In view thereof, it follows that the subject matter of the claims would not have been obvious over Morita et al. in view of Kanai et al. at the time the invention was made.

Claims 19, 21-26, 29, and 30 stand rejected under 35 U.S.C.

103(a) as being unpatentable over Matsumoto et al. in view of Laney et al. It is the conclusion of the Examiner that "...one of ordinary skill in the art would have obviously been motivated to determine the optimum area ratio between the non-stretched sheet and the biaxially stretched film applied in the process of Matsumoto through routine experimentation based upon reaching increased mechanical strength" and "It would have been obvious to use Laney's teaching for using microbeads in the polyester material taught by Matsumoto because of the absorbency properties which efficiently absorb printed inks without the need of multiple processing steps or multiple coated layers." The Examiner additionally states, "It would have been obvious to one of ordinary skill at the time of the invention to pick one of the directions to perform stretching in the machine direction first (machine) before the second direction (transverse).

This rejection is traversed. The Examiner has overlooked the fact that the comparative data in Table 2 of the present application clearly rebuts the Examiner's allegation. In point of fact, the present application clearly shows in Table 2 that Comparative Example 4 and 5, which are attempts at making the permeable layer of Laney's extruded film as a monolayer, without a base layer, are not **manufacturable**. Furthermore, Laney explicitly teaches that the permeable microvoided sheet comprises both a permeable layer and a base layer integrally extruded (column 2, lines 38-41). Hence, Laney cannot possibly teach forming a monolayer of permeable microvoided sheet of polylactic acid. In fact, a fair reading of the teachings of Matsumoto and Laney is that it would be surprising that a monolayer film of polylactic-acid-based material having interconnected microvoids around inorganic particles could be obtained. The microvoids would obviously make it considerably more difficult to extrude as a monolayer, so the fact that Matsumoto can extrude a polylactic-acid-based material that is not microvoided certainly does not suggest, and there is no suggestion otherwise, that one could extrude a polylactic-acid-based material that is microvoided. In fact, the prior art teaches the opposite. It is possible to extrude a monolayer of non-microvoided polyester, but that a microvoided layer must be integrated with a microvoided layer to avoid tearing.

As conceded by the Examiner, Matsumoto does not teach blending inorganic particles into a melt comprising polylactic-acid-based material and forming

interconnected microvoids. Laney, on the other hand teaches forming microvoids in poly(ethylene terephthalate) polyester and says nothing with respect to polylactic-acid-based materials. A key point is that none of the polyesters mentioned by Laney US Patent No. 6,379,780 that were evaluated for the open-cell voided absorbent layer could be produced as a mono-layered film without tearing during manufacturing. That is why Laney US Patent No. 6,379,780 claims a multi-layered film. The present invention is based on the unobvious discovery with a polylactic-acid material that the inventors were able to manufacture (without tearing) the open-celled absorbent layer as a mono-layered film, which has significant value.

Moreover, Matsumoto would not use Laney's teaching for using microbeads in his polyester material, because Matsumoto teaches against a permeable microvoided monolayer. Furthermore, Matsumoto is interested in making films that are transparent and exhibit a higher tensile stretch. Microvoiding the material would destroy transparency and seriously weaken the tensile strength, which is why any motivation by Matsumoto to microvoid the material is seriously absent. In sum, neither Matsumoto nor Laney, alone or in combination, teach a microvoided monolayer of polylactic-acid-based material and, in fact, teach against it.

The extruded material of the present invention is useful as a material for a porous inkjet receiver in which the open-celled structure would allow for liquid water to be significantly absorbed. Having strived to create such structures for some time, the present inventors have found that only at inorganic loadings above 60% by weight and with biaxial stretch ratios of greater than 3 can significant absorptive films be attained with polylactic acid. None of the examples presented by Matsumoto et al. have both these requirements of high inorganic loadings and biaxial stretching that are necessary to produce the monolayer film having the requiring permeable microvoiding. In fact the examples in Matsumoto et al. would have no liquid absorption characteristics, which is clearly desired and required by Matsumoto.

It is clear that the Examiner's rationale for combining Matsumoto et al. and Laney et al. selectively picks from each reference only what might in isolation might teach a given feature of the present invention, while ignoring any accompanying feature that teaches against the invention or the combination. Without any coherent rationale for such selective picking and choosing and combining, the

rejection is based entirely on hindsight based on Applicants' own disclosure obtained only after considerable research and development efforts and expense.

In view thereof, it follows that the subject matter of the claims would not have been obvious over Matsumoto et al. in view of Laney et al. at the time the invention was made.

Applicants have reviewed the prior art made of record and believe that singly or in any suitable combination, they do not render Applicants' claimed invention unpatentable.

In view of the foregoing remarks and amendment, the claims are now believed allowable and such favorable action is courteously solicited.

Should the Examiner consider that additional amendments are necessary to place the application in condition for allowance, the favor is requested of a telephone call to the undersigned counsel for the purpose of discussing such amendments.

Respectfully submitted,



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